

Remarks

Applicant respectfully requests reconsideration of this application as amended. The specification has been amended to correct minor informalities. Claims 1, 2, 6-9, 13-16, 20-23, 27, and 28 have been amended. No claims have been cancelled or added. Therefore, claims 1-28 are presented for examination.

35 U.S.C. §103(a) Rejection

Claims 1-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over MMXTM CODE DEVELOPMENT STRATEGY [hereinafter “MMX”], in view of “Bitwidth Analysis with Application to Silicon Combination”, by Mark Stephenson et al. [hereinafter “Stephenson”]. Applicant submits that the present claims are patentable over MMX in view of Stephenson.

MMX discloses a strategy for developing code that can later benefit from MMX technology. It suggests making a plan before beginning any code implementation. This plan may consist of determining which part of a code will benefit from MMX technology. The plan also includes determining whether the code algorithm contains integer or floating point data. MMX also includes EMMS guidelines, CUID usage for detection of MMX technology, and tips on aligning and arranging data. (MMX at Chp. 4.)

Stephenson discloses a compiler that minimizes bitwidth (the number of bits used to represent each operand) for both integers and pointers in a program. The compiler frees the programmer from declaring bitwidth invariants in cases where the compiler can determine the bitwidths automatically. The compiler further incorporates sophisticated loop analysis techniques for identifying bitwidths. (Stephenson at pg. 108, Abstract.)

Claim 1, as amended, recites:

A method, comprising:
analyzing code using bitwise constant propagation by a language implementation system to determine a backward value for each alias in the code that reflects any reference to the alias occurring outside of and following the code under analysis;
determining whether an operation therein on a larger data type may be replaced with an operation on a smaller data type having a reduced precision, wherein the determining is based on the backward values of each alias in the analyzed code; and
replacing the operation on the larger data type with the operation on the smaller data type if so determined.

Applicant submits that MMX in view of Stephenson does not disclose or suggest determining whether an operation on a larger data type may be replaced by an operation on a smaller data type having a reduced precision, wherein the determining is based on the backward values of each alias in the analyzed code, as recited by claim 1.

First, MMX does not disclose or suggest determining whether an *operation* on a larger data type may be replaced by an *operation* on a smaller data type having a reduced precision. MMX discloses replacing larger *variable types* with smaller *variable types*. (See MMX at Chp. 4.) However, this is not the same as replacing an *operation* on a larger data type with another *operation* on a smaller data type. The feature disclosed in claim 1 is not replacing the variable being operated on, but rather replacing the actual operation. Applicant can find no disclosure or suggestion of such a feature in MMX. Furthermore, applicant submits that Stephenson does not disclose or suggest determining whether an *operation* on a larger data type may be replaced by an *operation* on a smaller data type having a reduced precision.

Second, applicant submits that MMX does not disclose or suggest the determining whether an operation on a larger data type may be replaced by an operation on a smaller data type *being based on a backward value of each alias in analyzed code*. As further recited in claim 1, the backward value reflects any reference to the alias occurring outside of and following the code under analysis. Applicant can find no disclosure or suggestion of such a feature in MMX. Nor can applicant find disclosure or suggestion of this feature in Stephenson.

As neither MMX nor Stephenson individually disclose or suggest the features of claim 1, any combination of MMX and Stephenson also would not disclose or suggest such features. Therefore, claim 1 is patentable over MMX in view of Stephenson. Claims 2-7 depend from claim 1 and include additional limitations. Therefore, claims 2-7 are also patentable over MMX in view of Stephenson.

Independent claims 8, 15, and 22 also recite, in part, determining whether an operation on a larger data type may be replaced by an operation on a smaller data type having a reduced precision, wherein the determining is based on the backward values of each alias in the analyzed code. As discussed above, MMX in view of Stephenson does not disclose or suggest such a feature. Therefore, claims 8, 15, and 22 are patentable over MMX in view of Stephenson for the reasons discussed above with respect to claim 1. Claims 9-14, 16-21, and 23-28 depend from claims 8, 15, and 22, respectively, and include additional limitations. Therefore, claims 9-14, 16-21, and 23-28 are also patentable over MMX in view of Stephenson.

Applicant respectfully submits that the rejections have been overcome and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

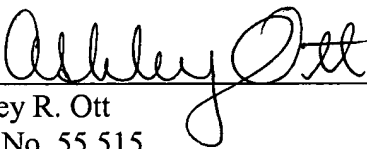
Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

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